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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,742	07/31/2001	James A. Moorer	M-11445 US	3946

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EXAMINER
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CHAU, COREY P

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 01/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/919,742

Applicant(s)

MOORER, JAMES A.

Examiner

Corey P Chau

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 and 33-56 is/are rejected.
- 7) ☒ Claim(s) 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/29/02.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 1 is objected to because of the following informalities: "spacings", on line 3 should be replaced with "spacing" and "colinear", on line 2 should be replaced with "collinear". Appropriate correction is required here and throughout the rest of the claims.
2. Claim 32 is objected to because of the following informalities: Claim 32 is a repeat of Claim 31. Appropriate correction is required.
3. Claim 54 is objected to because of the following informalities: "and the planar arrays are nondegenerate", on line 12 should be deleted. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 7, 10-15, 22, 25-31, 33, 35, 41-46, 51, and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5848170 to Mahieux et al. (hereafter as Mahieux).
6. Regarding Claim 1, Mahieux discloses a microphone system (Figs. 3b and 4a) comprising: a plurality of collinear microphones regularly spaced according to a plurality

of distinct spacing with a common center (Figs. 3b and 4a); a plurality of microphone signal adders (S1 to S4), wherein the microphones of each set of microphones having one of said spacing are connected to the same signal adder (Figs. 3b and 4a); a plurality of first filters (H1 to H4), each connected to receive the output of a corresponding one of the microphones signal adders; and an output adder (i.e. Sigma) connected to receive the output of the first filters and supply the combined signal as an output, wherein the frequency response of the first filters is such that the combined signal is flat over a selected frequency range in a selected direction (Figs 3b and 4a).

7. Regarding Claim 7, Mahieux discloses the frequency response of each of the first filters is a continuous function of frequency (H1 to H4), the response of the first filter corresponding to the smallest spacing being zero below a first frequency (H4), constant above a second frequency and linear between the first and second frequency, the response of the first filter corresponding to the largest spacing being zero above a third frequency (H1), constant below a fourth frequency and linear between the third and fourth frequency, and wherein for each of the other first filters, the response is zero outside of a respective frequency range and inside the respective frequency range linearly increasing below a respective intermediate frequency and linearly decreasing above the respective intermediate frequency (Fig. 3b).

8. Regarding Claim 10, Mahieux discloses the number of spacing is N and the spacing are  $2 \cdot \sup(i-1)d$ , where i runs from one to N and d is the smallest spacing (Fig. 3b).

9. Regarding Claim 11, Mahieux discloses N is equal to nine (Fig. 3b).

10. Regarding Claim 12, Mahieux discloses  $d$  is in a range of 0.5 centimeters to ten centimeter 9column 4, line 60 to column 5, line 6).

11. Regarding Claim 13, Mahieux discloses the number of microphones corresponding to each of the spacing is three or more (Fig.3b; column 4, lines 35-64).

12. Regarding Claim 14. Mahieux discloses a microphone belongs to a plurality of the sets of microphones having one of said spacing (Fig.3b; column 4, lines 35-64).

13. Regarding Claim 15, Mahieux discloses a second plurality of microphone signal adders (Fig. 4a, reference S1-S3), wherein the microphones of each set of microphones having one of said spacing are connected to the same second signal adder (Fig. 4a); a second plurality of first filters (Fig. 4a, reference H1-H3), each connected to receive the output of a corresponding one of the second microphones signal adders; and an second output adder (Fig. 4a, reference Sigma) connected to receive the output of the second plurality of first filters and supply the combined signal as a second output, wherein the frequency response of the second plurality of first filters is such that the combined signal is flat over a selected frequency range in a second selected direction (Fig. 4a).

Regarding Claim 16, Mahieux discloses a microphone system comprising: a planar array of a plurality of microphones regularly spaced in the direction of a first axis according to a plurality of first spacing centered (Fig. 3b) on a second axis (Fig. 4a) and regularly spaced in the direction of the second axis according to a plurality of second spacing centered on the first axis, wherein the axes are nondegenerate; a plurality of microphone signal adders (Fig. 3b, reference S1-S4; Fig. 4a, reference S1-S3), wherein the microphones of each set of microphones forming a line having one of said spacing

parallel to one of said axes are connected to the same adder (Figs. 3b and 4a); a plurality of first filters, each connected to receive the output of a corresponding one of the microphones signal adders (Fig. 3b, reference H1-H4; Fig. 4a, reference H1-H3); and an output adder connected to receive the output of the filters and supply the combined signal as an output (Figs. 3a-b, 4a, and 4d, reference Sigma).

14. Claim 22 is essentially similar to Claim 7 and is rejected for the reasons stated above apropos to Claim 7.

15. Claim 25 is essentially similar to Claim 10 and is rejected for the reasons stated above apropos to Claim 10 (Figs. 3a-b, 4a, and 4d).

16. Claim 26 is essentially similar to Claim 11 and is rejected for the reasons stated above apropos to Claim 11 (Figs. 3a-b, 4a, and 4d).

17. Claim 27 is essentially similar to Claim 12 and is rejected for the reasons stated above apropos to Claim 12 (Figs. 3a-b, 4a, and 4d).

18. Claim 28 is essentially similar to Claim 13 and is rejected for the reasons stated above apropos to Claim 13.

19. Claim 29 is essentially similar to Claim 14 and is rejected for the reasons stated above apropos to Claim 14.

20. Regarding Claim 30, Mahieux discloses d.sub.1 is equal to d.sub.2. (column 5, line 1-6; column 7, lines 54-59)

21. Regarding Claim 31, Mahieux discloses the axes are orthogonal (Figs. 3a-b, 4a, and 4d; column 3, line 59 to column 4, line 22).

22. Regarding Claim 33, Mahieux discloses a number of the microphone systems of claim 16, wherein the planar arrays are non-coplanar and the number is two or more (Figs. 3a-b, 4a, and 4d).

23. Regarding Claim 34, Mahieux discloses number is two, wherein the planar arrays are orthogonal, and wherein the axes in the planar arrays are orthogonal (Figs. 3a-b, 4a, and 4d; column 3, line 59 to column 4, line 22).

24. Claim 35 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1.

25. Claim 41 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1.

26. Regarding Claim 42, Mahieux discloses microphones are arranged collinearly and the distinct spacing share a common center (Fig. 3b).

27. Claim 43 is essentially similar to Claim 10 and is rejected for the reasons stated above apropos to Claim 10.

28. Claim 44 is essentially similar to Claim 11 and is rejected for the reasons stated above apropos to Claim 11.

29. Claim 45 is essentially similar to Claim 12 and is rejected for the reasons stated above apropos to Claim 12.

30. Claim 46 is essentially similar to Claim 13 and is rejected for the reasons stated above apropos to Claim 13.

31. Claim 51 is essentially similar to Claim 7 and is rejected for the reasons stated above apropos to Claim 7.

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32. All element of Claim 54 are comprehended by Claim 16. Claim 54 is rejected for the reasons stated above apropos to Claim 16.

33. Claims 1-2, 8-14, 16, 23-24, 35, 39-41, and 52-53 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5684882 to Mahieux et al (hereafter as Mahieux).

34. Regarding Claim 1, Mahieux discloses a microphone system (Fig. 1a) comprising: a plurality of collinear microphones regularly spaced according to a plurality of distinct spacing (Figs. 1a-c) with a common center ( $M_0$ ); a plurality of microphone signal adders ( $2_1$  to  $2_4$ ), wherein the microphones of each set of microphones having one of said spacing are connected to the same signal adder (column 6, line 21 to column 7, line 12); a plurality of first filters ( $4_1$  to  $4_4$ ), each connected to receive the output of a corresponding one of the microphones signal adders (Fig. 1a); and an output adder (5) connected to receive the output of the first filters and supply the combined signal as an output, wherein the frequency response of the first filters is such that the combined signal is flat over a selected frequency range in a selected direction (Fig. 6a).

35. Regarding Claim 2, Mahieux discloses a plurality of second filters (Fig. 5a), wherein each of the connections of one of the microphones to one of the microphone signal adders is made through one of the second filters.

36. Regarding Claim 8, Mahieux discloses the selected frequency range is greater than five octaves (column 1, lines 49-55).



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37. Regarding Claim 9, Mahieux discloses the selected frequency range is from 20 hertz to 20 kilohertz (column 1, lines 49-55).

38. Regarding Claim 10, Mahieux discloses the number of spacing is N and the spacing are  $2 \cdot \sup_{i=1}^{N-1} d_i$ , where i runs from one to N and d is the smallest spacing (Figs. 1a-c).

39. Regarding Claim 11, Mahieux discloses N is equal to nine (Figs. 1a-c).

40. Regarding Claim 12, Mahieux discloses d is in a range of 0.5 centimeters to ten centimeter (column 4, lines 48-57).

41. Regarding Claim 13, Mahieux discloses the number of microphones corresponding to each of the spacing is three or more (Figs. 1a-c).

42. Regarding Claim 14, Mahieux discloses a microphone belongs to a plurality of the sets of microphones having one of said spacing (Figs. 1a-c; column 6, lines 20-52).

43. Claim 16 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1 (Figs. 1a-c).

44. Claim 23 is essentially similar to Claim 8 and is rejected for the reasons stated above apropos to Claim 8.

45. Claim 24 is essentially similar to Claim 9 and is rejected for the reasons stated above apropos to Claim 9.

46. Claim 35 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1.

47. Claim 39 is essentially similar to Claim 8 and is rejected for the reasons stated above apropos to Claim 8.

48. Claim 40 is essentially similar to Claim 9 and is rejected for the reasons stated above apropos to Claim 9.

49. Claim 41 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1 (Figs. 1a-c).

50. Claim 52 is essentially similar to Claim 8 and is rejected for the reasons stated above apropos to Claim 8.

51. Claim 53 is essentially similar to Claim 9 and is rejected for the reasons stated above apropos to Claim 9.

***Claim Rejections - 35 USC § 103***

52. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

53. Claims 2-6, 17-21, 36-38, 47-50, and 55-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5848170 to Mahieux in view of U.S. Patent No. 4741038 to Elko et al (hereafter as Elko).

54. Regarding Claims 2 and 3, Mahieux does not expressly disclose a plurality of second filters, wherein each of the connections of one of the microphones to one of the microphone signal adders is made through one of the second filters. However it would have been obvious to one having ordinary skill in the art to provide a second filter,

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wherein the second filter implements a windowing function in order to reduce side lobe response, as taught by Elko (column 6, lines 12-33).

55. Regarding Claim 4, Mahieux as modified discloses a window function, however it would have been obvious to one having ordinary skill in the art to utilize any known windowing function, such as a Kaiser-Bessel window functions.

56. Regarding Claim 5, Mahieux as modified does not expressly disclose the second filters implement a delay. However it would have been obvious to one having ordinary skill in the art to provide such a delay in order to point the array beam in any desired direction, as taught by Elko (column 7, lines 9-13).

57. Regarding Claim 6, Mahieux as modified discloses the delay of a given second filter is proportional to the spacing of the set of microphones to which the microphone it belongs corresponds, and wherein all the second filters depend upon the same function of a steering angle (column 6, line 48-64).

58. Claim 17 is essentially similar to Claim 2 and is rejected for the reasons stated above apropos to Claim 2.

59. Claim 18 is essentially similar to Claim 3 and is rejected for the reasons stated above apropos to Claim 3.

60. Claim 19 is essentially similar to Claim 4 and is rejected for the reasons stated above apropos to Claim 4.

61. Claim 20 is essentially similar to Claim 5 and is rejected for the reasons stated above apropos to Claim 5.

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62. Claim 21 is essentially similar to Claim 6 and is rejected for the reasons stated above apropos to Claim 6.

63. Claim 36 is essentially similar to Claim 3 and is rejected for the reasons stated above apropos to Claim 3.

64. Claim 37 is essentially similar to Claim 4 and is rejected for the reasons stated above apropos to Claim 4.

65. Claim 38 is essentially similar to Claim 5 and is rejected for the reasons stated above apropos to Claim 5.

66. Claim 47 is essentially similar to Claim 3 and is rejected for the reasons stated above apropos to Claim 3.

67. Claim 48 is essentially similar to Claim 4 and is rejected for the reasons stated above apropos to Claim 4.

68. Claim 49 is essentially similar to Claim 5 and is rejected for the reasons stated above apropos to Claim 5.

69. Claim 50 is essentially similar to Claim 6 and is rejected for the reasons stated above apropos to Claim 6.

70. Claim 55 is essentially similar to Claims 1 and 5 and is rejected for the reasons stated above apropos to Claims 1 and 5.

71. Regarding Claim 56, Mahieux does not expressly disclose the plurality of signals from an array of microphones are provided from a pre-recording of said signals.

However it would have been obvious to one having skill in the art to utilize any known input signals such as a pre-recording.

72. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5684882 to Mahieux in view of U.S. Patent No. 4741038 to Elko.

73. Regarding Claim 3, Mahieux does not expressly disclose the second filters implement windowing functions. However it would have been obvious to one having ordinary skill in the art to have the second filter implement windowing function in order to reduce side lobe response, as taught by Elko (column 6, lines 12-33).

74. Regarding Claim 4, Mahieux as modified discloses a window function, however it would have been obvious to one having ordinary skill in the art to utilize any known windowing function, such as a Kaiser-Bessel window functions.

75. Regarding Claim 5, Mahieux as modified does not expressly disclose the second filters implement a delay. However it would have been obvious to one having ordinary skill in the art to provide such a delay in order to point the array beam in any desired direction, as taught by Elko (column 7, lines 9-13).

76. Regarding Claim 6, Mahieux as modified discloses the delay of a given second filter is proportional to the spacing of the set of microphones to which the microphone it belongs corresponds, and wherein all the second filters depend upon the same function of a steering angle (column 6, line 48-64).

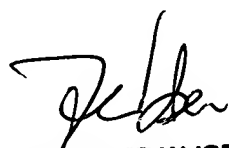
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Corey P Chau whose telephone number is (703)305-0683. The examiner can normally be reached on Monday - Friday 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 13, 2004

  
**FORESTER W. ISEN**  
**SUPERVISORY PATENT EXAMINER**